

Elections 2022

Federative Republic of Brazil
Document under confidentiality - Prohibited Disclosure

Compliance Analysis

October 29th, 2022

CONFIDENTIAL

2022 FIRST ROUND BRAZILIAN PRESIDENTIAL ELECTIONS VULNERABILITY ANALYSIS REPORT

INTRODUCTION

The present document aims to report, from the perspective of a Forensic Science consolidated method based on a statistical analysis observational process, the 2022 First round Brazilian Election counting data. The observational method used is Benford's Law.

The observed data used is available on the Brazilian Superior Electoral Court's (*Tribunal Superior Eleitoral - TSE*).

NEWCOMB-BENFORD'S LAW

Benford's Law, also called the law of the first digit, or Newcomb-Benford's Law, and the law of anomalous numbers, refers to the distribution of digits in various sources of real cases. Instead of expected homogeneity, the law states in many naturally occurring numbers collections the first significant digit is likely to be small. Without homogeneity, this distribution shows digit 1 has probability of appearing 30% in a statistical data set, while larger values are less likely to appear.

Frank Benford has shown this result applies to a wide variety of data sets, including electricity bills, addresses, stock prices, private equity prices, population numbers, death rates, river lengths, physical and mathematical constants, by power laws (which are very common in nature). All these statements are calculated or defined on a logarithmic scale.

Probability	0	1	2	3	4	5	6	7	8	9
1st position	---	30.1	17.6	12.5	9.7	7.9	6.7	5.8	5.1	4.6
2nd position	12	11.4	10.9	10.4	10	9.7	9.3	9	8.8	8.5
3th position	10.2	10.1	10.1	10.1	10	10	9.9	9.9	9.9	9.8

NEWCOMB-BENFORD'S LAW APPLICATIONS

- Judicial Evidence
- Electoral Data Analysis
- Macroeconomic Data
- Tax Fraud Analysis of
- Genome Data Analysis
- Scientific Fraud Detection

Following Benford's Law, or Looking Out for No. 1

By MALCOLM W. BROWNE AUG. 4, 1998

DR. THEODORE P. HILL asks his mathematics students at the Georgia Institute of Technology to go home and either flip a coin 200 times and record the results, or merely pretend to flip a coin and fake 200 results. The following day he runs his eye over the homework data, and to the students' amazement, he easily fingers nearly all those who faked their tosses.

"The truth is," he said in an interview, "most people don't know the real odds of such an exercise, so they can't fake data convincingly."

There is more to this than a classroom trick.

Dr. Hill is one of a growing number of statisticians, accountants and mathematicians who are convinced that an astonishing mathematical theorem known as Benford's Law is a powerful and relatively simple tool for pointing suspicion at frauds, embezzlers, tax evaders, sloppy accountants and even computer bugs.

(Benford's Law in New York Times)

[<https://www.nytimes.com/1998/08/04/science/following-benford-s-law-or-looking-out-for-no-1.html>]

Benford's Law in Brazil

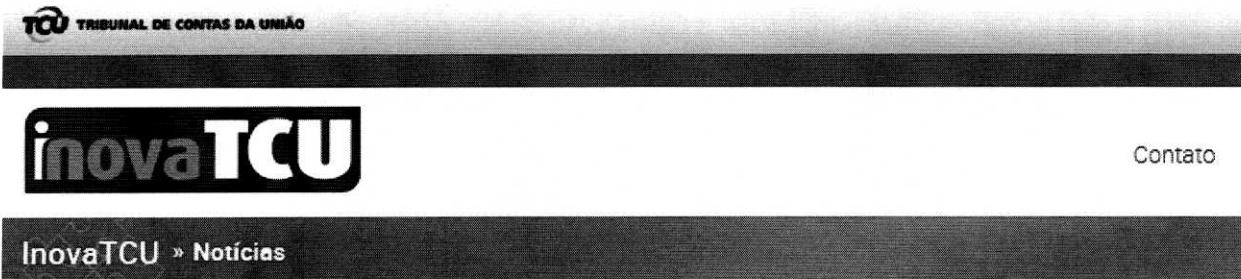
Written on Auditors Brazilian Court (TCU) website:

"Several studies have been conducted adopting the hypothesis that fabricated data is identified by digits deviation with respect to Benford's distribution."

"Walter Mebane, an American statistician at the University of Michigan, has studied election data from several countries, including the United States, Russia, and Mexico."

"The researcher analyzed the data from the Iranian elections in 2009 and found anomalies that strongly indicated the occurrence of fraud in the victory of politician Ahmadinejad (Mebane, 2009)."

[<https://portal.tcu.gov.br/imprensa/noticias/aplicacoes-da-lei-de-benford-a-auditoria-de-oberas-publicas.htm>]



Aplicações da Lei de Benford à auditoria de obras públicas

As análises de preços nas auditorias de obras públicas por vezes ocupam semanas de trabalho do auditor, pois, em muitos casos, as planilhas orçamentárias são extensas e de difícil análise. A Lei Newcomb-Benford é uma ferramenta de mineração de dados, alternativa à Curva ABC, que permite uma seleção possivelmente mais precisa dos serviços das planilhas para análise de preço.

</inovatcu/noticias/aplicacoes-da-lei-de-benford-a-auditoria-de-oberas-publicas.htm>

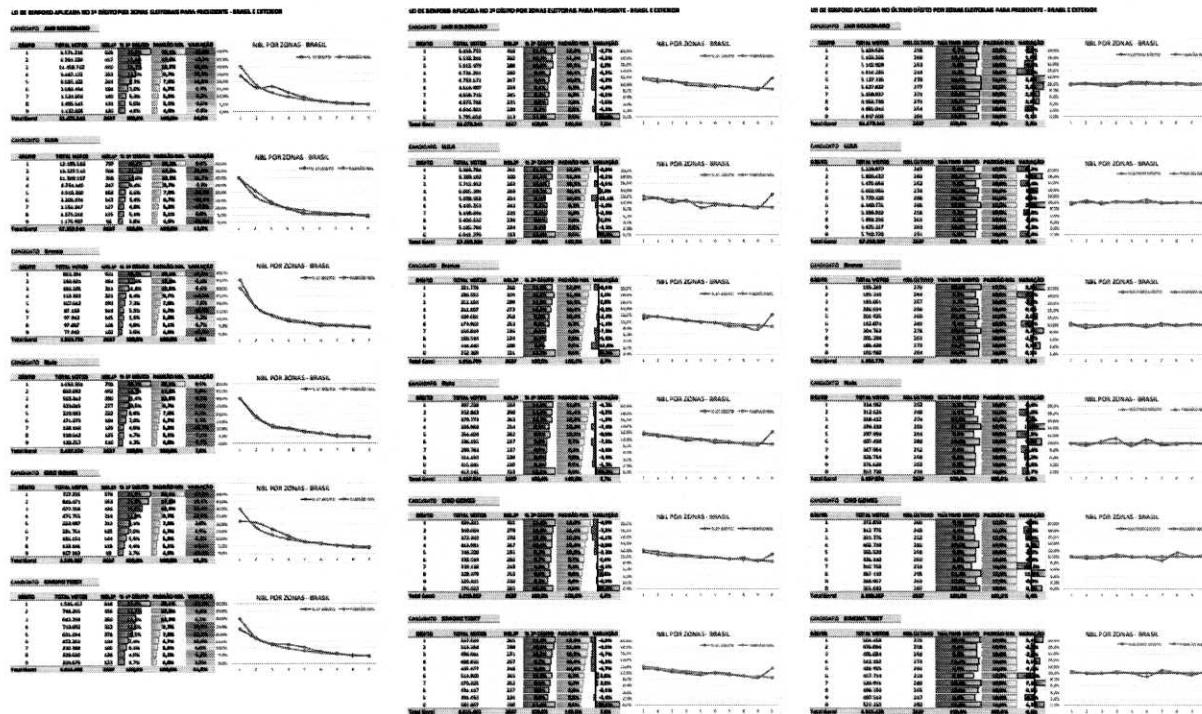
Walter Mebane, um estatístico americano da Universidade de Michigan, estudou dados eleitorais de vários países, incluindo os Estados Unidos, Rússia e México. Em 2006, ele descobriu que a contagem dos votos tendia a seguir a Lei de Benford no segundo dígito (Mebane, 2006). O pesquisador analisou os dados das eleições iranianas em 2009 e encontrou anomalias que indicavam fortemente a ocorrência de fraude na vitória do político Ahmadinejad (Mebane, 2009). Mebane verificou que, nas cidades com poucos votos inválidos, os números de Ahmadinejad passavam longe da distribuição de Benford e que o candidato, nessas situações, possuía uma grande vantagem nos votos.

Considering the highest national auditing body recognizes and propagates the use of Benford Logic in public audits, including at the electoral level, we began to analyze the

2022 Brazilian presidential election first round data. This technique allows us to make very quick conclusions about the numerical sets's consistency.

NEWCOMB-BENFORD'S LAW IN BRAZILIAN ELECTIONS

The 2022 Brazilian presidential election first round data analysis revealed statistical sets inconsistencies. This fact does not assert itselfs there was intervention or data external tampering. This can only be affirmed after meticulous and detailed investigation from the standpoint of defending the National Sovereignty interests. There was undoubted proof of external access to the electoral operation system in recent past elections. The subject was headlined in several media and the electoral system operator itself recognized this fact, including the forwarding of documents to police authorities. But the 2022 numerical indications - regardless of this fact and before considering whether there were external vulnerabilities in the last election - corroborate the need for protective measures as a precautionary measure. See the electoral zone grouping charts below.



As an example, this is a panoramic view of data analysis grouped by electoral zones. It is possible to verify there are many numerical sets, in different readings and formats, that

present apparent non-conformities with the NBL parameters, which will be the object of specific deeper analysis.

Pure data was used for the analysis, obtained from the TSE (Superior Electoral Court) data repository. [<https://www.tse.jus.br/eleicoes/eleicoes-2022/divulgacao-dos-resultados-das-eleicoes-2022>]

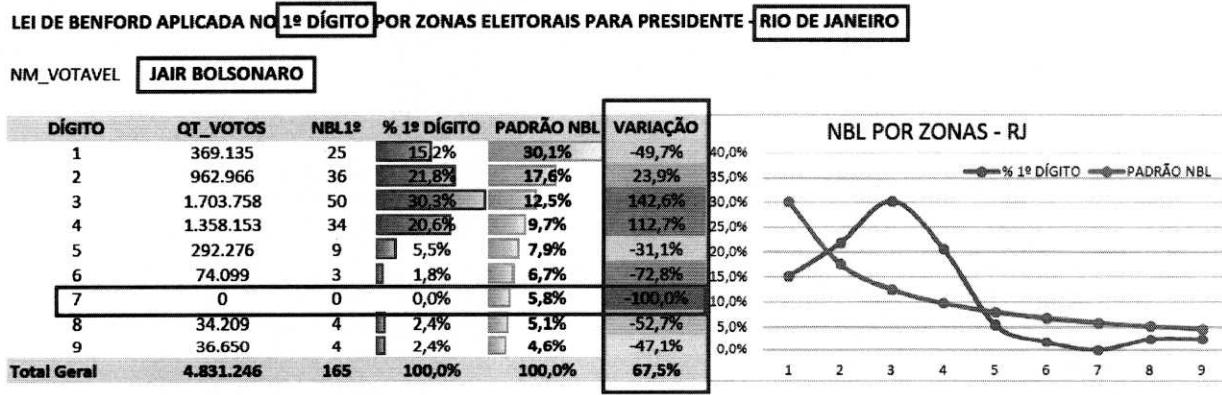
The data was properly decompressed and inserted in appropriate databases - in parallel and redundant checking operations - in order to preserve the originality of the data in the imported tables. The main analysis was restricted and concentrated on the position for president, reaching the candidates with the 4 highest votes, and also comparing the "White" and "Null" votes.

The application of the 1st digit rule for NBL requires numbers that meet all numeric series that reach the digits 1 to 9, in the case of Electoral Zones and Cities. Both serve the purpose of leveraging the NBL (Newcomb-Benford Law) rule. However, the study done by cities, if performed with a very restricted universe, may generate distortions.

The population distance between the largest and the smallest electoral zone in Brazil has a smaller interval than the population distance between the smallest and the largest Brazilian municipality.

The first study part uses the 1st digit NBL rule, in which the 2,637 Electoral Zones in Brazil and abroad were evaluated. The presence of distortion is noted, where the average deviation exceeds the possible margins of error.

As an initial planimetric overview, some graphs are presented in sequence. These are the data will be further study object (1):



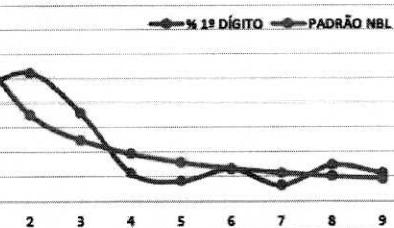
(1) This table contains the UMIs - Minimal Informational Units - used for the present study. It will be repeated several times during the text. It is generated in Portuguese, because it reflects images captured directly from the primary data processing. Its columns are as follows, with their respective meanings in English: Digit/Quantity Votes / NBL1st / %1st Digit/ NBL Pattern / Variation / NBL by Zones / Total

LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - PERNAMBUCO

NM_VOTAVEL JAIR BOLSONARO

DÍGITO	QT_VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	313.796	28	23,0%	30,1%	-23,8%
2	354.527	32	26,2%	17,6%	+48,9%
3	570.906	22	18,0%	12,5%	+44,4%
4	140.155	7	5,7%	9,7%	-40,2%
5	28.070	5	4,1%	7,9%	-48,5%
6	51.005	8	6,6%	6,7%	-2,0%
7	30.521	4	3,3%	5,8%	-43,5%
8	76.150	9	7,4%	5,1%	+44,1%
9	65.808	7	5,7%	4,6%	+25,3%
Total Geral	1.630.938	122	100,0%	100,0%	35,7%

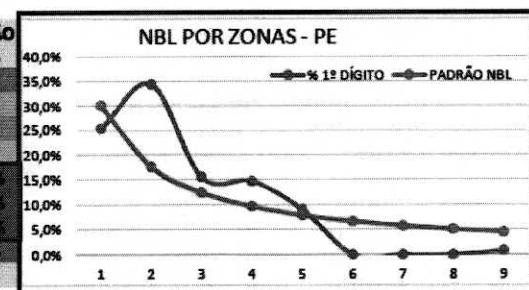
NBL POR ZONAS - PE



NM_VOTAVEL LULA

DÍGITO	QT_VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	504.494	31	15,4%	30,1%	-15,6%
2	1.003.556	42	34,4%	17,6%	+95,9%
3	650.745	19	15,6%	12,5%	+24,7%
4	816.827	18	14,8%	9,7%	+52,3%
5	573.275	11	9,0%	7,9%	+13,8%
6	0	0	0,0%	6,7%	-100,0%
7	0	0	0,0%	5,8%	-100,0%
8	0	0	0,0%	5,1%	-100,0%
9	9.425	1	0,8%	4,6%	-92,1%
Total Geral	3.558.322	122	100,0%	100,0%	64,0%

NBL POR ZONAS - PE



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - CEARÁ

NM_VOTAVEL AMÉLIO RODRIGO

DÍGITO	QT_VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	386.648	29	15,3%	19,0%	-24,4%
2	364.460	34	18,7%	14,0%	+40,0%
3	342.515	19	10,9%	7,9%	+38,9%
4	32.130	7	4,0%	9,7%	-58,7%
5	32.187	6	3,5%	7,9%	-56,7%
6	51.082	8	7,2%	6,7%	+8,5%
7	68.379	8	7,2%	6,0%	+12,0%
8	24.644	4	2,2%	3,7%	-18,9%
9	38.455	4	2,2%	4,6%	-50,0%
Total Geral	1.597.027	160	100,0%	100,0%	22,3%

LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA SENADOR - CEARÁ

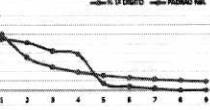
NM_VOTAVEL KAMILA CARDOSO

DÍGITO	QT_VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	3.074.142	29	15,3%	19,0%	-24,4%
2	291.513	37	19,0%	14,0%	+40,0%
3	297.791	17	10,6%	7,9%	+38,9%
4	31.069	7	4,0%	9,7%	-58,7%
5	61.235	11	5,1%	7,9%	-28,9%
6	51.712	8	7,2%	6,7%	+8,5%
7	38.259	5	2,6%	5,1%	-50,0%
8	51.982	7	4,0%	5,1%	-28,9%
9	38.343	3	1,6%	4,6%	-64,4%
Total Geral	5.279.378	360	100,0%	100,0%	23,3%

NM_VOTAVEL LIRA

DÍGITO	QT_VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	346.705	23	13,3%	19,0%	-36,8%
2	838.123	34	20,0%	14,0%	+42,9%
3	604.237	17	10,0%	7,9%	+28,9%
4	1.211.473	27	17,7%	9,7%	+85,0%
5	200.713	6	5,0%	7,9%	-35,9%
6	185.459	3	2,0%	4,6%	-50,0%
7	74.232	1	0,8%	3,7%	-78,7%
8	0	0	0,0%	3,7%	-100,0%
9	0	0	0,0%	4,6%	-100,0%
Total Geral	3.570.325	160	100,0%	100,0%	6,8%

NBL POR ZONAS - CE



The cases above (RJ, CE and PE States) were demarcated because they showed a high incidence of "zero" in cells where there should be a positive value. They are here placed as detected anomalies at the State level examples. However, their isolated study cannot be dissociated from the global study with aggregated data.

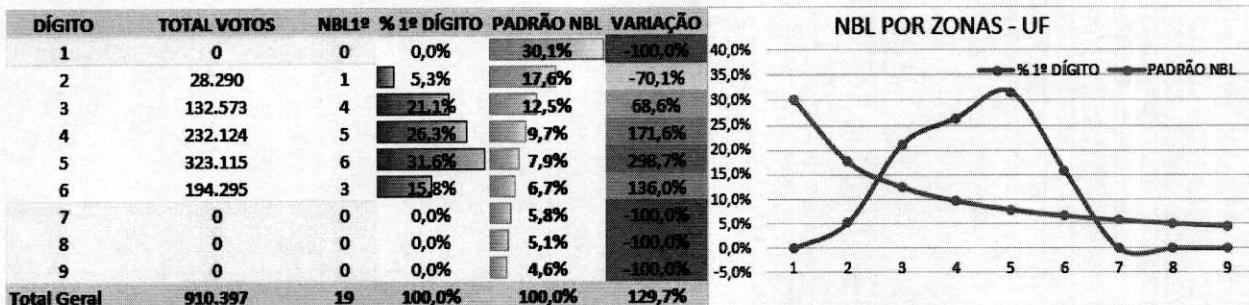
LEI DE BENFORD APLICADA NO 2º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - POR UF

UF **AC**
CANDIDATO JAIR BOLSONARO



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - POR UF

UF **DF**
CANDIDATO JAIR BOLSONARO



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - POR UF

UF **CE**
CANDIDATO LULA



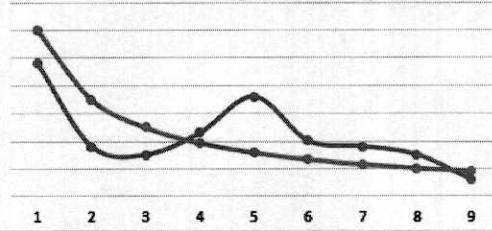
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - POR UF

UF BA
CANDIDATO JAIR BOLSONARO

DÍGITO	TOTAL VOTOS	NBL1º	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	735.732	48	24,1%	30,1%	-19,9%
2	334.500	18	9,0%	17,6%	-48,6%
3	228.035	15	7,5%	12,5%	-39,7%
4	103.120	23	11,6%	9,7%	19,3%
5	197.271	36	18,1%	7,9%	128,4%
6	128.393	20	10,1%	6,7%	50,2%
7	135.615	18	9,0%	5,8%	56,0%
8	128.804	15	7,5%	5,1%	47,2%
9	56.129	6	3,0%	4,6%	-34,2%
Total Geral	2.047.599	199	100,0%	100,0%	47,3%

NBL POR ZONAS - UF

% 1º DÍGITO PADRÃO NBL



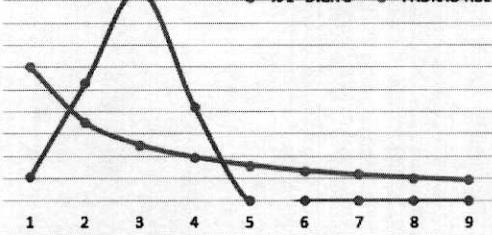
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - POR UF

UF DF
CANDIDATO LULA

DÍGITO	TOTAL VOTOS	NBL1º	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	19.602	1	5,3%	30,1%	-82,5%
2	128.291	5	26,3%	17,6%	49,4%
3	330.102	9	47,4%	12,5%	279,3%
4	171.539	4	21,1%	9,7%	117,3%
5	0	0	0,0%	7,9%	-100,0%
6	0	0	0,0%	6,7%	-100,0%
7	0	0	0,0%	5,8%	-100,0%
8	0	0	0,0%	5,1%	-100,0%
9	0	0	0,0%	4,6%	-100,0%
Total Geral	649.534	19	100,0%	100,0%	109,2%

NBL POR ZONAS - UF

% 1º DÍGITO PADRÃO NBL



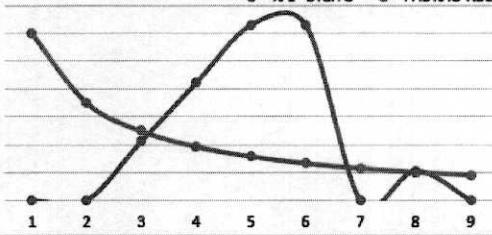
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - POR UF

UF DF
CANDIDATO SIMONE TEBET

DÍGITO	TOTAL VOTOS	NBL1º	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	0	0	0,0%	30,1%	-100,0%
2	0	0	0,0%	17,6%	-100,0%
3	6.771	2	10,5%	12,5%	-15,7%
4	18.757	4	21,1%	9,7%	117,3%
5	32.942	6	31,6%	7,9%	298,7%
6	38.634	6	31,6%	6,7%	372,0%
7	0	0	0,0%	5,8%	-100,0%
8	8.273	1	5,3%	5,1%	2,8%
9	0	0	0,0%	4,6%	-100,0%
Total Geral	105.377	19	100,0%	100,0%	147,3%

NBL POR ZONAS - UF

% 1º DÍGITO PADRÃO NBL



Similarly to the isolated state-level data from DF, AC, BA, and CE, states also show anomaly identification in the detected groups records.

Considering the short time between the expedition of the definitive results and the analysis, it is evident the need to unfold these referenced foci as a particularized observation point.

If it were the case of a specific document audit [the primary purpose of Benford's Law, i.e., to select indicative focuses and to conduct a document audit], these would be the first round of specific document audits potential focuses. This is not possible in the current Brazilian electoral model, considering the inexistence of a documental collection that could elide the doubts pointed out by Benford's examination in these foci.

We present below all the data tables referring to the votes obtained by the 4 most voted candidates, with the tabulations referring to blank and spoiled votes, in the following order:

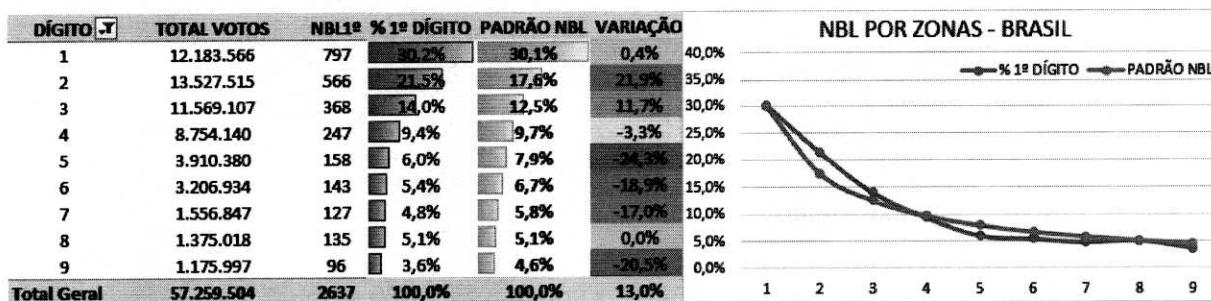
- a) National Quantitative;
- b) Regional Quantitative.

A total of 36 graphical data views regarding the LNB analysis in the 1st digit are presented below.

First, the national data aggregated by the first digit:

LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - BRASIL E EXTERIOR

CANDIDATO LULA 



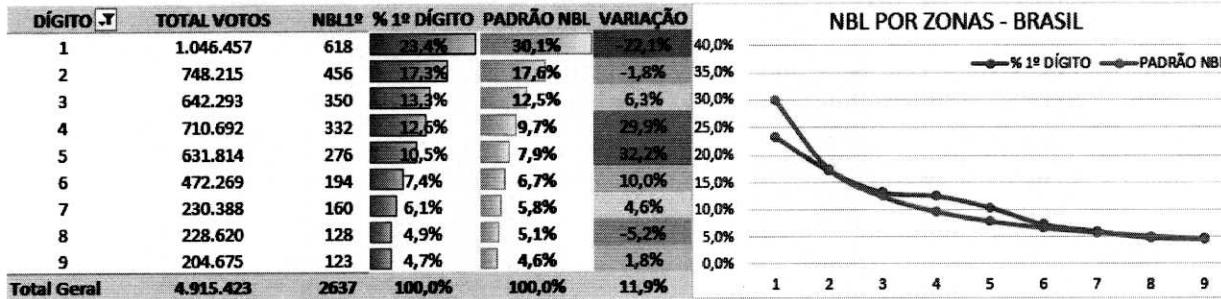
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - BRASIL E EXTERIOR

CANDIDATO JAIR BOLSONARO 



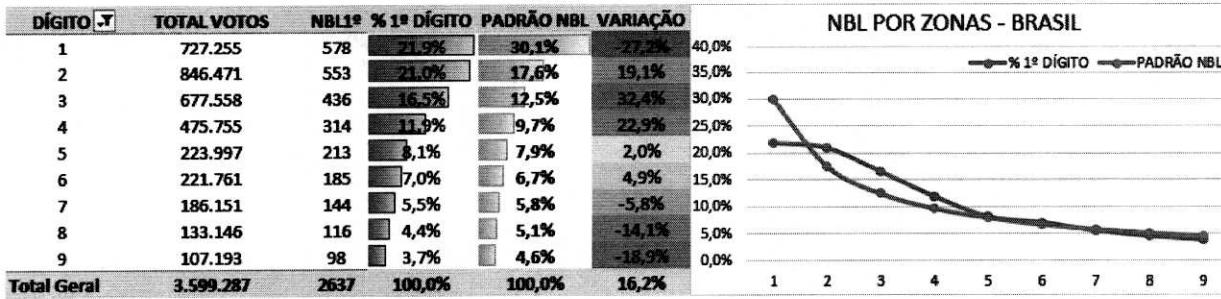
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - BRASIL E EXTERIOR

CANDIDATO SIMONE TEBET 



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - BRASIL E EXTERIOR

CANDIDATO CIRO GOMES 



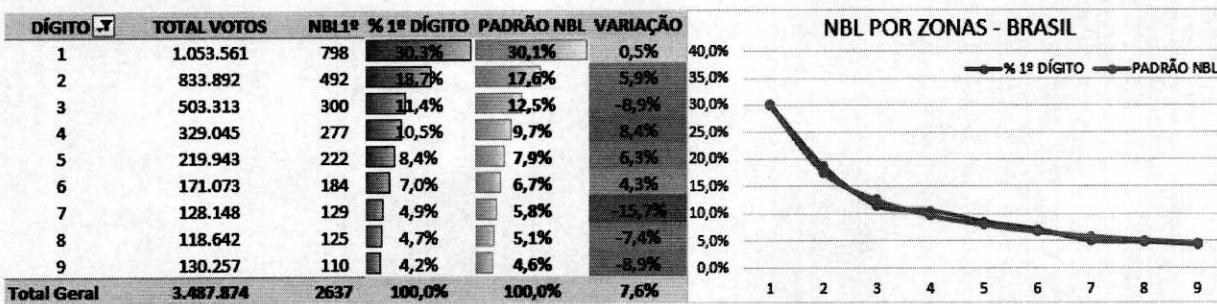
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - BRASIL E EXTERIOR

CANDIDATO Branco



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - BRASIL E EXTERIOR

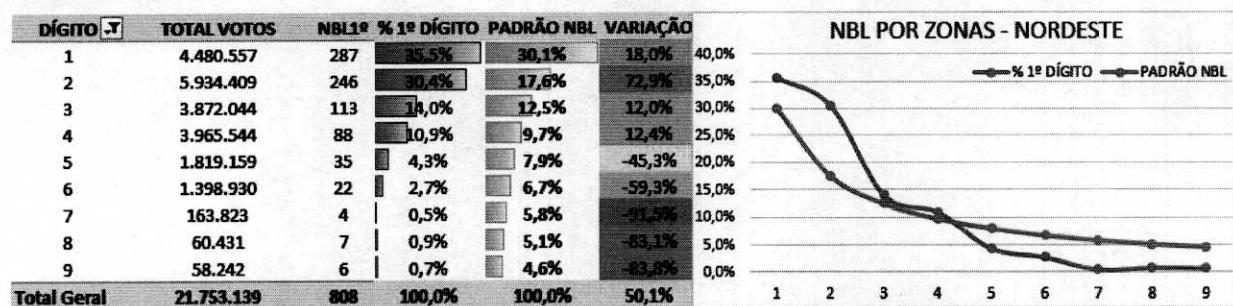
CANDIDATO Nulo



Here the data by region:

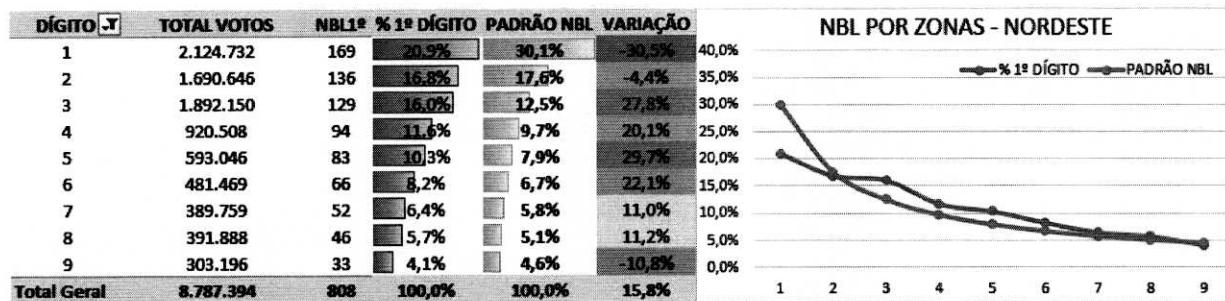
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO LULA



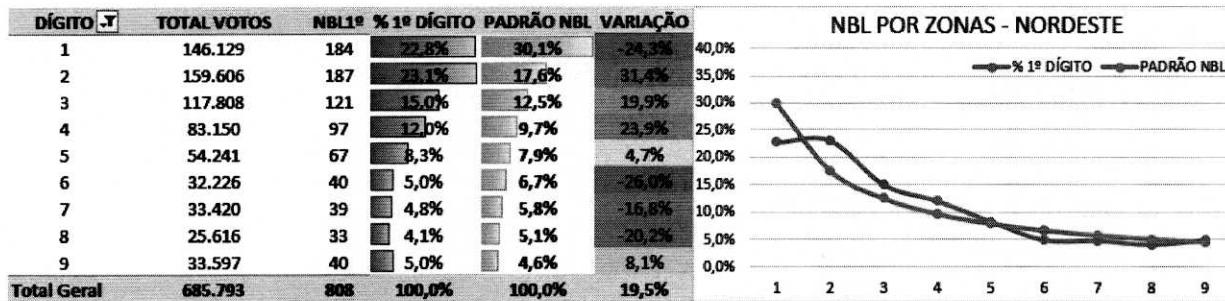
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO JAIR BOLSONARO 



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO SIMONE TEBET 



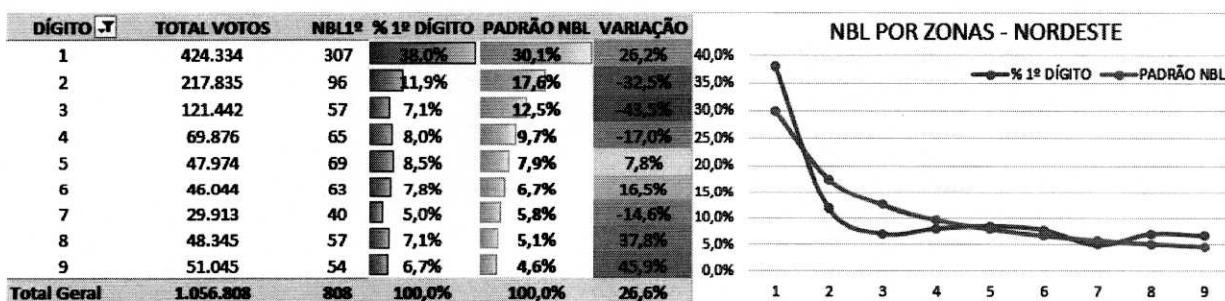
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO Branco 



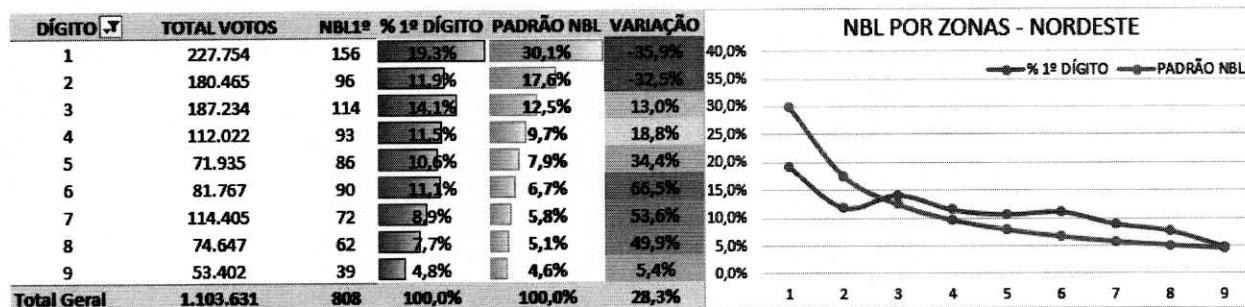
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO Nulo 



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO CIRO GOMES 



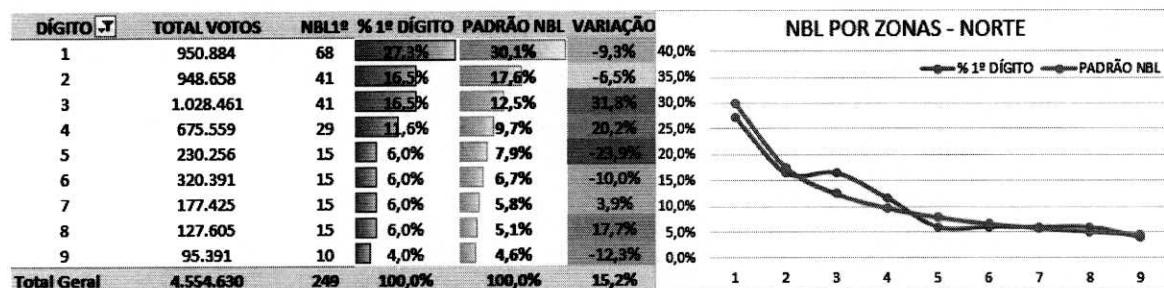
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORTE

CANDIDATO JAIR BOLSONARO 



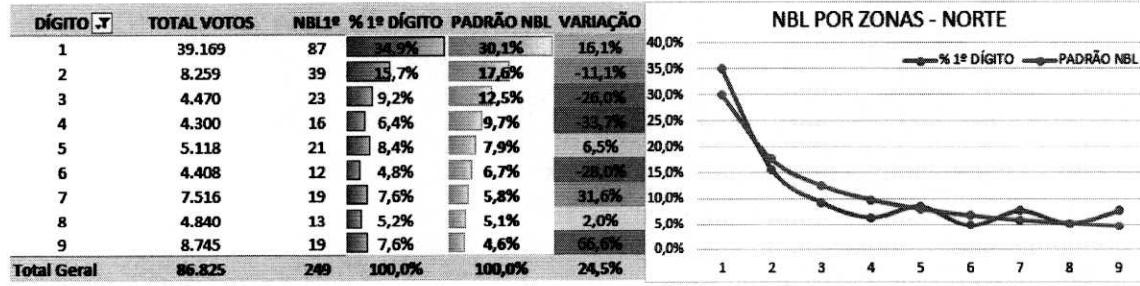
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORTE

CANDIDATO LULA 



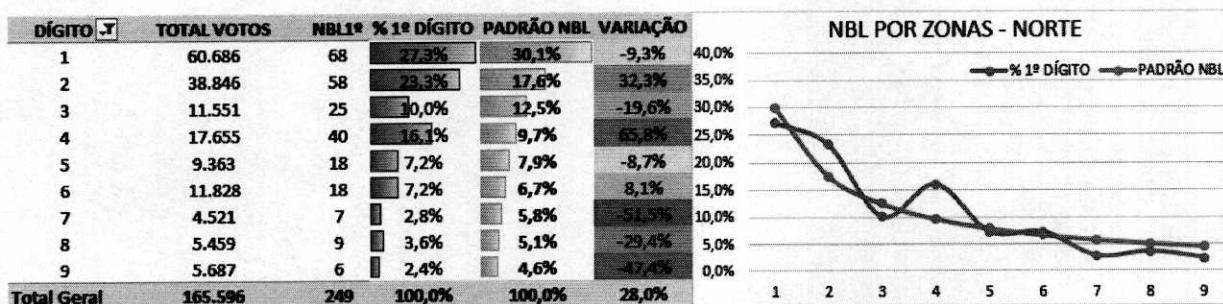
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORTE

CANDIDATO Branco 



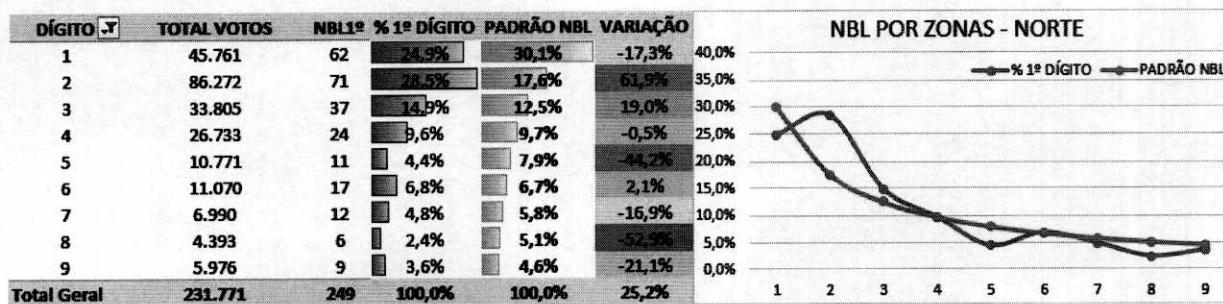
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORTE

CANDIDATO Nulo [\[T\]](#)



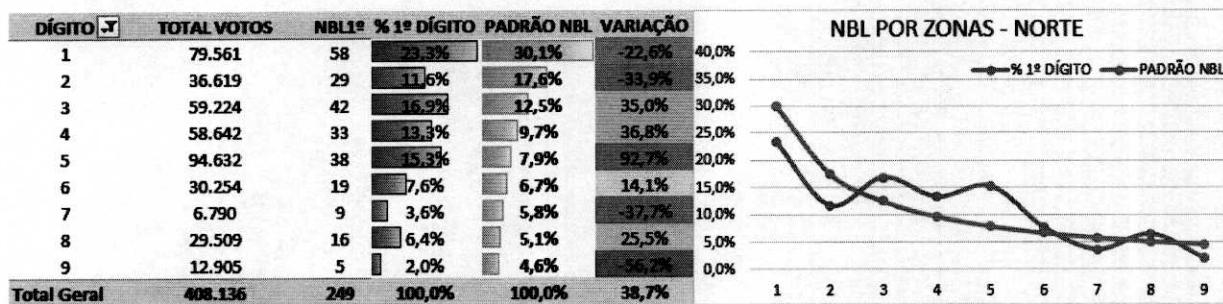
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CANDIDATO CIRIO GOMES [\[T\]](#)



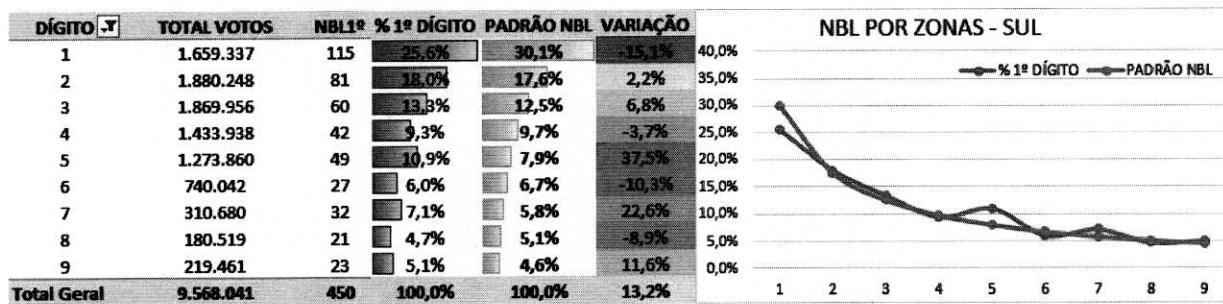
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CANDIDATO SIMONE TEBET [\[T\]](#)



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CANDIDATO JAIR BOLSONARO 



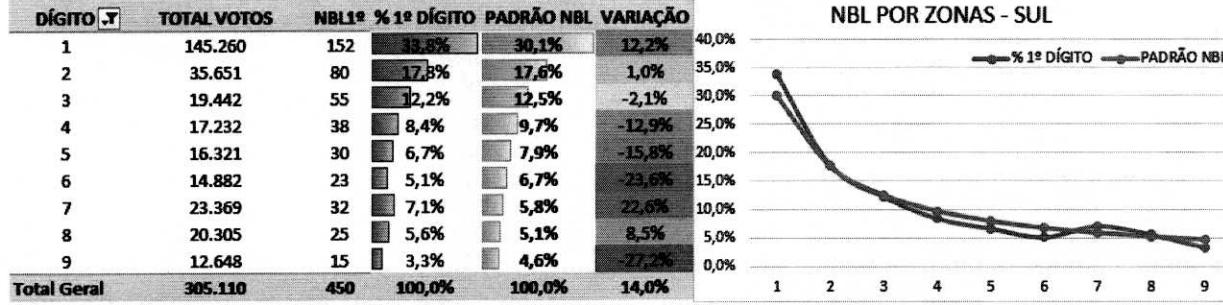
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CANDIDATO LULA 



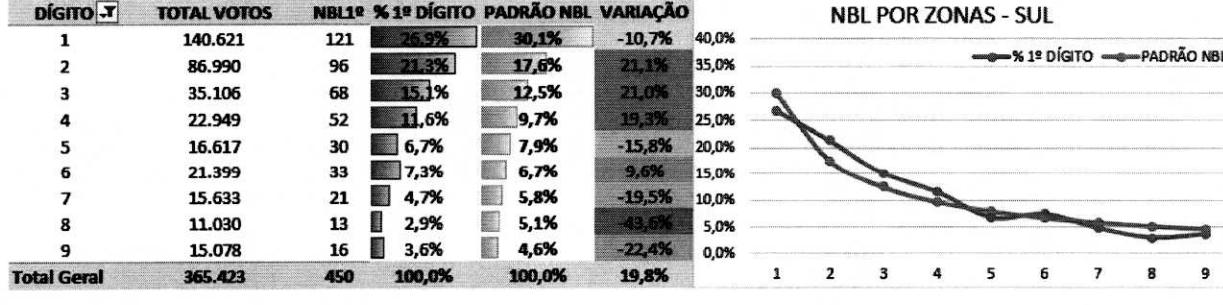
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CANDIDATO Branco 



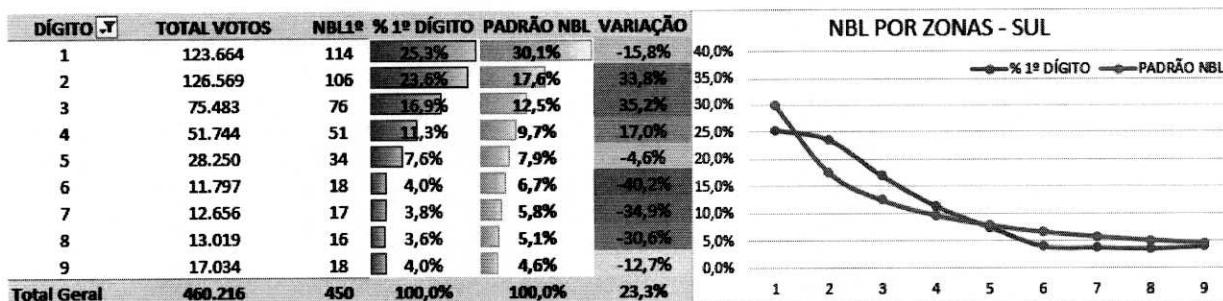
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUL

CANDIDATO Nulo 



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUL

CANDIDATO CIRO GOMES 



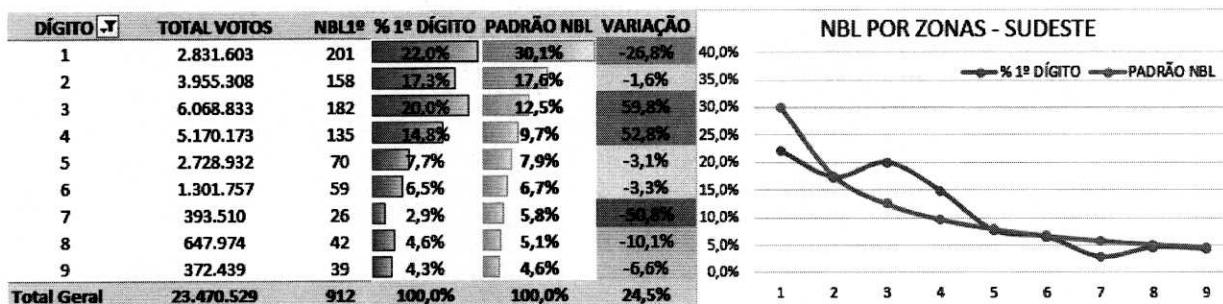
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUL

CANDIDATO SIMONE TEBET 



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUDESTE

CANDIDATO JAIR BOLSONARO 



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUDESTE

CANDIDATO LULA 

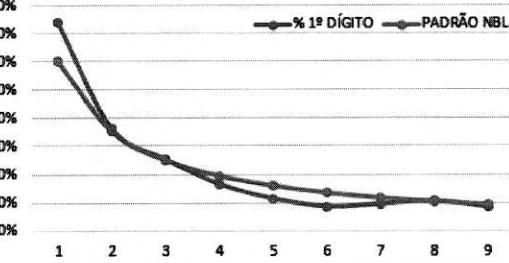


LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUDESTE

CANDIDATO Branco 

DÍGITO 	TOTAL VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	430.100	336	36,8%	30,1%	22,4%
2	229.762	165	18,1%	17,6%	2,7%
3	122.144	116	12,7%	12,5%	1,8%
4	46.572	75	8,2%	9,7%	-15,1%
5	37.601	52	5,7%	7,9%	-28,0%
6	25.396	39	4,3%	6,7%	-36,1%
7	32.347	43	4,7%	5,8%	-18,7%
8	41.024	48	5,3%	5,1%	2,8%
9	35.050	38	4,2%	4,6%	-9,0%
Total Geral	999.996	912	100,0%	100,0%	14,2%

NBL POR ZONAS - SUDESTE

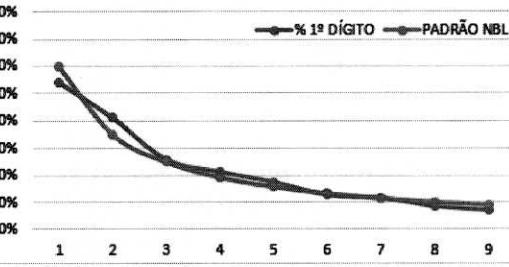


LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUDESTE

CANDIDATO Nulo 

DÍGITO 	TOTAL VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	362.768	247	27,1%	30,1%	-10,0%
2	435.229	188	20,6%	17,6%	17,1%
3	323.989	118	12,9%	12,5%	3,5%
4	204.009	97	10,6%	9,7%	9,8%
5	132.292	80	8,8%	7,9%	10,8%
6	84.101	58	6,4%	6,7%	-4,9%
7	71.942	53	5,8%	5,8%	0,2%
8	48.669	39	4,3%	5,1%	-16,5%
9	56.525	32	3,5%	4,6%	-22,4%
Total Geral	1.719.524	912	100,0%	100,0%	10,9%

NBL POR ZONAS - SUDESTE

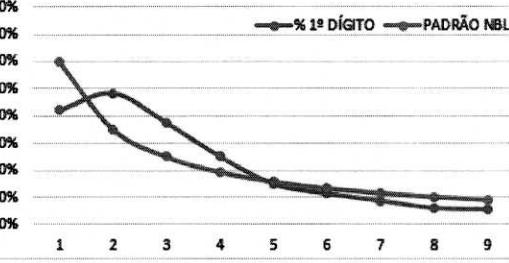


LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUDESTE

CANDIDATO CIRO GOMES 

DÍGITO 	TOTAL VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	276.812	192	21,1%	30,1%	-30,1%
2	390.605	221	24,2%	17,6%	37,6%
3	326.240	171	18,8%	12,5%	50,1%
4	246.504	114	12,5%	9,7%	29,0%
5	105.763	68	7,5%	7,9%	-5,9%
6	106.475	52	5,7%	6,7%	-14,8%
7	49.976	40	4,4%	5,8%	-24,4%
8	39.281	28	3,1%	5,1%	-40,0%
9	24.918	26	2,9%	4,6%	-37,8%
Total Geral	1.566.574	912	100,0%	100,0%	28,6%

NBL POR ZONAS - SUDESTE

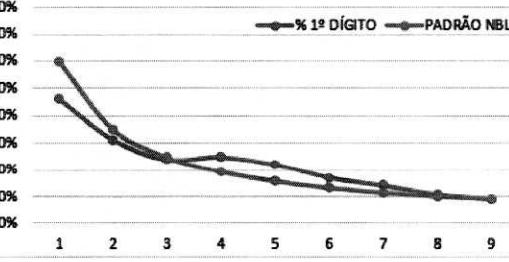


LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO SUDESTE

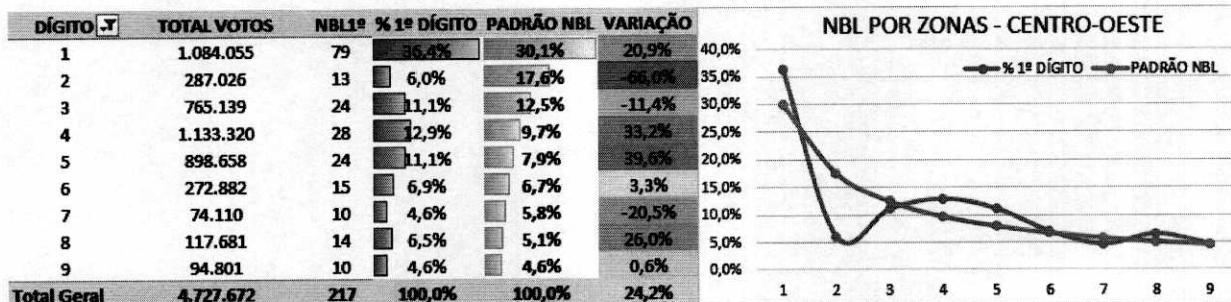
CANDIDATO SIMONE TEBET 

DÍGITO 	TOTAL VOTOS	NBL ^{1º}	% 1º DÍGITO	PADRÃO NBL	VARIAÇÃO
1	581.359	210	23,0%	30,1%	-23,5%
2	354.855	142	15,6%	17,6%	-11,6%
3	309.278	110	12,1%	12,5%	-3,4%
4	359.701	114	12,5%	9,7%	29,0%
5	337.262	101	11,1%	7,9%	39,8%
6	261.663	78	8,6%	6,7%	27,8%
7	141.650	65	7,1%	5,8%	22,9%
8	141.573	50	5,5%	5,1%	7,1%
9	90.207	42	4,6%	4,6%	0,6%
Total Geral	2.577.548	912	100,0%	100,0%	17,8%

NBL POR ZONAS - SUDESTE



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO CENTRO-OESTE
CANDIDATO JAIR BOLSONARO



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO CENTRO-OESTE
CANDIDATO LULA



LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO CENTRO-OESTE
CANDIDATO Branco



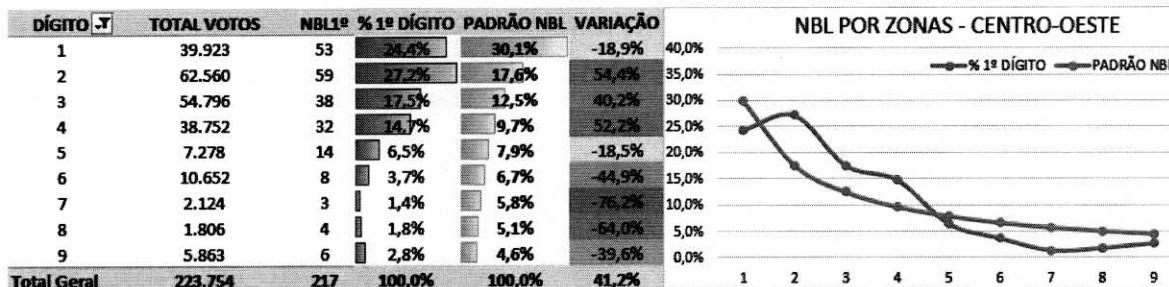
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CANDIDATO Nulo 



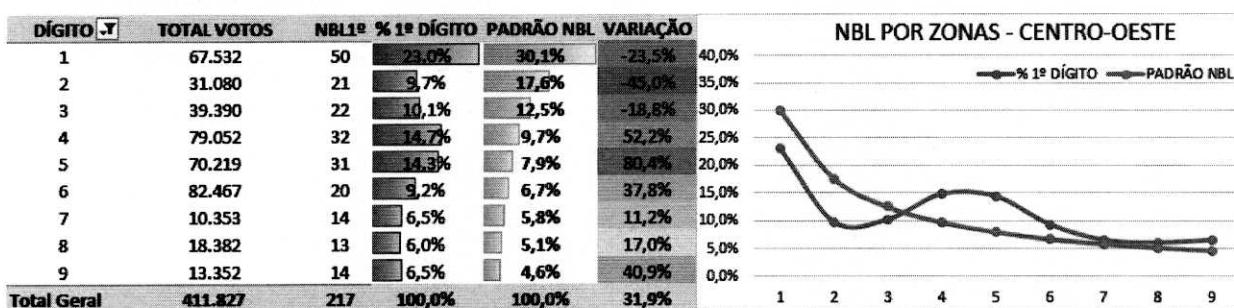
LEI DE BENFORD APLICADA NO 1º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO CENTRO-OESTE

CANDIDATO CIRO GOMES 



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CANDIDATO SIMONE TEBET 



2ND DIGIT RULE

Another Benford Law technique used, works with the 2nd digit. The renowned researcher Walter Mebane, from University of Michigan, used this technique to evaluate the 2009 Iranian elections. Strong anomalies were found that indicated the victory of politician Ahmadinejad. In this series, the data were worked by electoral zones, considering the votes that reached more than 10 votes, in order to benefit only the 2nd digit.

The historical proportions for the second digit are as follows:

Probabilidades	0	1	2	3	4	5	6	7	8	9
1º posição	—	30.1%	17.6%	12.5%	9.7%	7.9%	6.7%	5.8%	5.1%	4.6%
2º posição	12%	11.4%	10.9%	10.4%	10%	9.7%	9.3%	9%	8.8%	8.5%
3º posição	10.2%	10.1%	10.1%	10.1%	10%	10%	9.9%	9.9%	9.9%	9.8%

In the graphs below, it is possible to see the apparent distortions occurring in the totals aggregated by Electoral Zones of the Brazilian states, later grouped by geographic region. As shown in the graphs, a data aggregate amount which analysis focuses on the second digit can present apparent distortions. These distortions should be the object of specific studies, which will be seen in subsequent data series.

The following is a group of examples in which there are regions by the second digit clustering. There are also evidence of anomalies in data distribution:

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CANDIDATO JAIR BOLSONARO 



LEI DE BENFORD APLICADA NO 2º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORTE

CANDIDATO JAIR BOLSONARO 



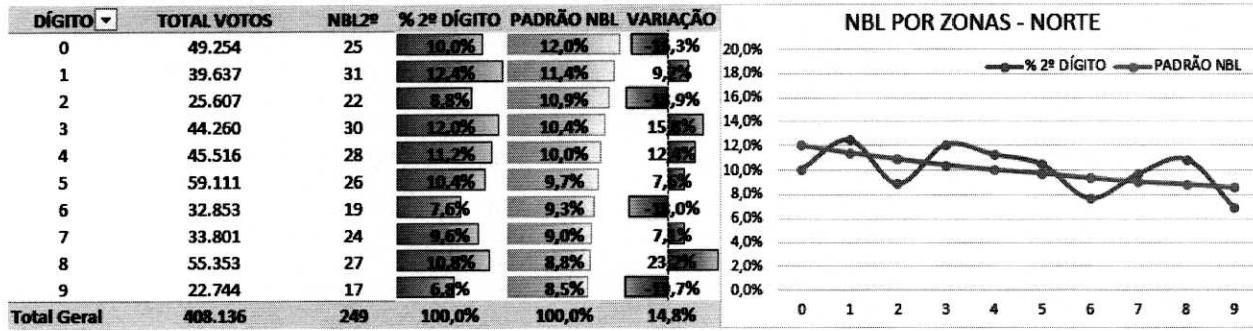
LEI DE BENFORD APLICADA NO 2º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORTE

CANDIDATO Nulo 



LEI DE BENFORD APLICADA NO 2º DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORTE

CANDIDATO SIMONE TEBET 



These 4 graphs present - all of them - show an average variation index higher than 10%.

Regarding the last digit analysis, we have a straight line, with the inversion of the parameters, instead of a descending curve with the ideal values of Benford's Law. There is a lot of data and graphs of the entire electoral universal data from all over the country. As an example and indicative element, we bring some graphs described below:

LEI DE BENFORD APLICADA NO ÚLTIMO DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO Branco



LEI DE BENFORD APLICADA NO ÚLTIMO DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

CANDIDATO Nulo



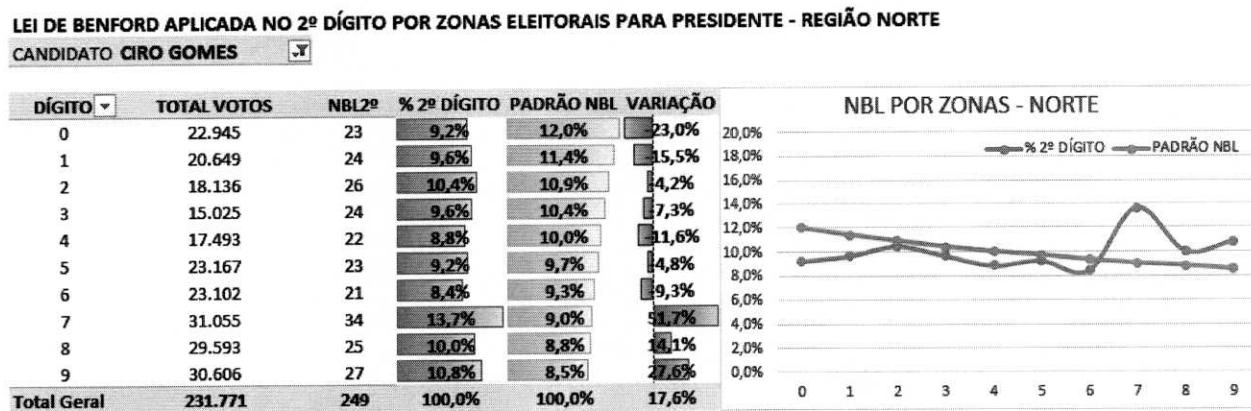
LEI DE BENFORD APLICADA NO ÚLTIMO DÍGITO POR ZONAS ELEITORAIS PARA PRESIDENTE - REGIÃO NORDESTE

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In these three numerical groups presented, there is a very interesting phenomenon from an analytical point of view. *Where there should be a line, there is a curve.*

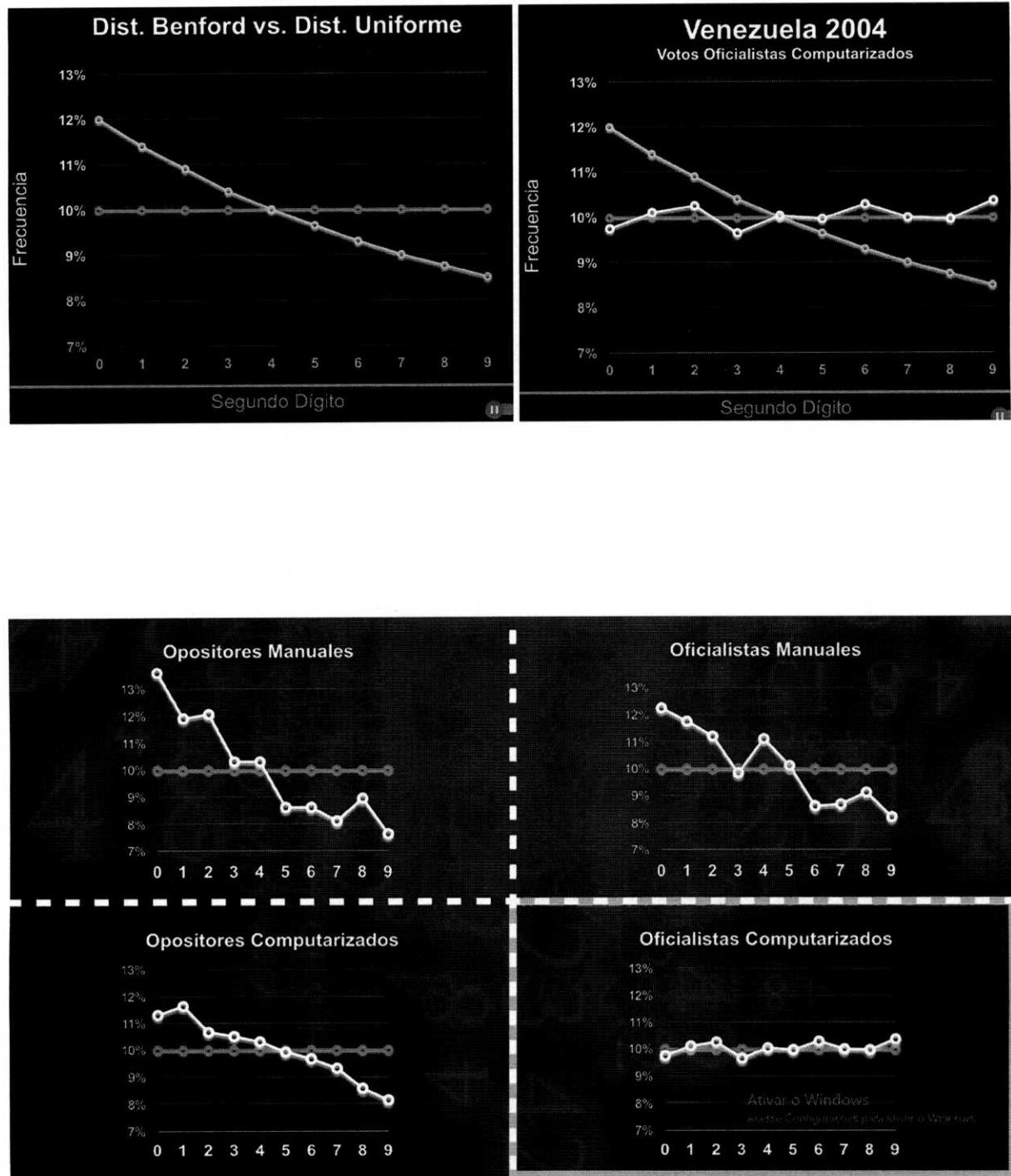
There is another case with similar (but reversed) behavior derived from second digit data:



In this example, the inverse occurs. Where there should be a "descending curve", there is an "almost straight", or a slightly ascending curve. This type of situation (curves where there should be straights, or straights where there should be curves, or rising curves versus falling curves) materializes the highest level concern sign about the integrity of the data sets. This constitutes a strong indicative element.

This kind of inversion is exactly what happened in the controversial Venezuelan election of 2004. The inversion of axes occurred, which may mean that some of the number sets are not products of natural distribution, but of random number generators. The hypothesis is explained in the video documentary "El Poder de la Matemática", available on Youtube. [<https://www.youtube.com/watch?v=IZNiFCvlbP8&t=303s>]

The video is described as follows : “May 25, 2013 Documentary showing the Enron case and the 2004 Presidential Recall Referendum in Venezuela, in which the use of mathematics, specifically Benford's Law, was used to detect fraud”. Here are some screenshots taken directly from this documentary:



In the 7 min and 44 seconds of the video is presented the situation in which the inversion between straight lines/curves occurs (highlighted in yellow). It is observed that among the 4 numerical groups graphs where there should be a behavior adhering to Benford's patterns, this occurs only in 3 groups. One of them does not follow the Benford patterns, but rather the patterns of equitable digits distribution. This tends to be a pattern anomaly by NBL view.

This behavior [*inversion between curves and straight lines*] was identified in at least 4 situations in the 2022 First Round Brazilian presidential elections.

CONCLUSION

- i) The sixth column of each table contains the percentage variation that occurred between the parameter considered "ideal" for the NBL and the actual data found. In several cells this variation had a significant amount.
- ii) Obtaining the average variation of each table we have the following scenario;
 - ii.a) 30 times - in 30 scenarios - this difference exceeded the 10% variation mark outside the ideal NBL parameter.
 - ii.b) In 18 occasions this average discrepancy exceeds 20%;
 - ii.c) In 7 occasions it exceeds the average of 30%, 1 of them exceeds 40%, and another exceeds 50%.
- iii) The comparative of items "i", "ii" e "iii" considers 30 tables (5 regions composed by the 4 most voted candidates, plus blank and null votes) referring to the 1st digit analysis;
- iv) There are other types of variations that do not claim to the standards considered adequate, considering the second and last digits analysis, as well as there are specific situations of more intense aggravation (such as the cases of "zero" cells in the states mentioned). However, these data are localized and need to be examined in the context of the national data set.
- v) Records found in the data sets generate the inversion between "descending curves", "straight", "ascending curves", which also occurred in the 2004 Venezuela case cited in the body of the text.

Considering the analyzed data as well as the evidential profile of Benford's Law (and not probative), the most correct procedure to be adopted in sequence should be a deep and detailed audit, with analysis and comparison of PHYSICAL DOCUMENTS against the graphic evidence identified, in order to be able to elide or confirm the detected anomalies.

Ex positis, and considering the speed and scarcity of time, it is concluded that [as in the past] there is a potential for risk of undue penetration and the realization of artificial data tampering that justifies the discrepancies found - without this being assertion constitutes, at the present time, a definitive evidence. This fact constitutes an evidentiary element and may give rise to the adoption of **EMERGENT** and **URGENT** measures regarding the preservation of **NATIONAL SOVEREIGNTY** of the Brazilian Nation in the face of possible international interests. It is necessary to guarantee the complete independence of the results for the second round, in the face of any international threat, as recorded. Such measures consist of joint and cooperative action of federative bodies, each within its own area of operation.

Obs: This document is a work in progress and will be expanded in the coming days. The accelerated way in which the study was produced and reported may lead to eventual spelling and writing inaccuracies, and it is under review immediately after its conclusion.